DOCUMENT RESUME

ED 161 152 EA 010 975

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TITLE	Kentucky's Declining School Population.
INSTITUTION	Kentucky State Dept. of Education, Frankfort.
PUB DATE	Nov 77
NOTE	19p.
EDRS PRICE	MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS	Cohort Analysis; *Declining Enrollment; Educational Research; Elementary Secondary Education; *Enrollment Projections; Graphs; Ratios (Mathematics); Tables (Data)
IDENTIFIERS	*Kentucky

ABSTRACT

Kentucky is one of the many states in which enrollment has declined since 1971. This study gathered data on the previous decline and then projected state enrollment up to 1981-82. The cohort-survival technique was used in projections. Numbers of live births and survival ratios were supplied by the Bureau of Vital Statistics. Survival ratios between classes were calculated from data on previous classes. A birth-to-first-grade survival ratio was calculated by dividing the number of first graders in one year by the number of live births six years earlier. This survival ratio was then multiplied by the live births of the years 1971 through 1976 to obtain projected first year enrollments for the school years 1977-76 through 1981-82. Projections of grade 2-12 enrollments were calculated in a similar manner. Graphs show that by 1981-82 enrollment will have declined by about 7.9 percent. If it is assumed that one teacher could adequately instruct 150 students per day, this decline would result in a need for approximately 348 fewer teachers by the 1981-82 school year. Educational planners who do not recognize obvious facts like declining enrollment may be contributing to a taxpayer's revolt. (Author/JM)

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KENTUCKY'S DECLINING SCHOOL POPULATION

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November 1977

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INTRODUCTION

One of the major problems facing educators across the nation is the declining public school enrollments. This was brought out quite clearly in a recent paper entitled "Declining Enrollments: A Survey of the States and Selected School Districts," prepared by Robert J. Dinkelmeyer and John J. Hudder, and published by the U.S. Department of Health, Education, and Welfare.[1] This paper states that, "many new problems have been created by the need to reduce physical plants, teaching and administrative staff and other resources from levels of use in previous periods of growing or peak enrollments. Table 1 was taken from the paper mentioned above and illustrates the changes in U.S. total enrollments from 1965 to 1975 and school enrollments projected from 1975 to 1985. These data show a marked change in the trend from one of increasing enrollments through the Sixties to one of decreasing enrollments through the mid-1980s.

Table 2, which was also taken from the above-mentioned paper, provides more information on annual changes in public schools by grade level. The data show continual growth in enrollments through the late 1960s, followed by continual declines beginning in 1972.

There were only three states in the U.S. which did not show a decline in enrollment of K-8 between the Fall of 1971 and the Fall of 1975. These three states were New Hampshire, Florida, and Arizona. The other 47 states showed a decline, ranging from Nevada with a low of .04 percent to Kansas with a high of 15.4 percent decline. When grades 9-12 were included, there were eight states which actually increased their enrollments during the years 1971 to 1975. These states ranged from a low percentage increase in Maine of .64 to a high percentage increase in Arizona of 3.98.

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[1]USOE, Selected Papers in School Finance 1976

TABLE 1

FALL ENROLLMENT IN REGULAR ELEMENTARY AND SECONDARY DAY SCHOOLS (in thousands.)

Total	1965	1975	% Change 1965-1975	1985 Projected	% Change 1975-1985
K-12	48,473	50,138	3.4%	46,058	-8.1%
Elementary	31,570	29,592	-6.3	29,106	-1.6
Secondary	16,904	20,546	21.5	16,952	-17.5
Public					
K-12	42,173	44,838	6.3	40,758	-9.1
Elementary	26,670	25,692	-3.7	25,206	-1.9
Secondary	15,504	19,146	23.5	15,552	-18.8
Nonpublic					
K-12	6,300	5,300	-15.9	5,300	0

Note: Projections assume that the percentage of school age pupils enrolling in school will continue the trends of the past 10 years and that birth rates and retention rates will remain constant.

Source: U.S. Dept. of Health, Education and Welfare, Education Division, Projections of Education Statistics to 1985-86. (U.S. Government Printing Office, 1977).

TABLE 2

PERCENTAGE CHANGE IN ENROLLMENTS FROM PREVIOUS YEAR:
U.S. PUBLIC FULL-TIME ENROLLMENTS, 1964 THROUGH 1975

Year	Grades K-12	Grades K-6	Grades 7-12	Grade 1	Kindergarten
1975-76	-0.5%	-1.2%	.3%	2.3%	6.9%
1974-75	-0.8	-1.6	.1	-1.6	8.4
1973-74	-0.8	-2.3	1.0	-3.5	5.5
1972-73	-0.7	-2.0	.8	-5.6	0.8
1971-72	0.4	-1.6	2.9	-6.2	-3.0
1970-71	0.6	-0.5	2.0	-1.0	-1.6
1969-70	1.5	0.6	2.7	-1.4	2.9
1968-69	1.6	0.9	2.6	-1.8	6.0
1967-68	2.7	2.1	3.4	1.5	0.9
1966-67	2.5	1.5	3.7	-0.1	3.6
1965-66	1.3	1.7	.9	2.1	3.5

Source: Grant, W. Vance and Lind, C. George, Digest of Educational Statistics 1976 Edition, National Center for Education Statistics, 1977, Table 34, p. 38.

Due to the increased number of articles appearing in print concerning this phenomenon and the apparent effect it would have on the future of educational endeavors in the Commonwealth of Kentucky, the Research Unit of the Kentucky Department of Education undertook the task of exploring this aspect even further. Kentucky was one of the 42 states which showed a considerable decrease in enrollment between the Fall of 1971 and the Fall of 1975. The need for more relevant local data was brought to light when the Director of the Unit for Research attended a conference of the International Society of Educational Planners. At this particular conference, the problems arising due to declining public school enrollment was the focal issue.

Problem Statement

With Kentucky being one of those states which was following the national trend of declining school enrollment, it would seem imperative for the Department of Education to provide more up-to-date and relevant data for educational planners throughout the state. Of specific concern was a comparison of what has actually happened in Kentucky as to school enrollment over the past few years and what is expected to happen over the next few years.

Methodology

The historical data as to what had actually happened in the past few years was a relatively simple task of compiling information which was available in the Department. It was decided to go back five years and collect historical data. This would take us back to the earlier years of the decade of the Seventies which was the beginning of the decline in school

population.

The task of projecting future enrollments was not as easy. However, after reviewing the literature it was found that the majority of states were using some modification of what is known as the Cohort-Survival Technique. After reviewing the procedure followed in utilizing this technique for making projections, it was decided that this was the most scientific technique which could be applied at this time.

This particular technique involves the use of live births and survival ratios as supplied by the Bureau of Vital Statistics along with survival ratios between classes in school, as determined from historical data. While some states have attempted to project live birth rates, it was felt by the Research Unit that this would be impractical in this case. For this reason it was decided to apply this projection technique only to those school years for which actual live birth data was available. Thus, the projections would be only for five years into the future.

The technique involved here uses a five-year period within the immediate past to determine the value to be used in projecting the size of the first grade class of the immediate future. The value used in these projections is the average of the birth-to-first grade survival rates for the past five years. A birth-to-first grade survival rate was calculated by dividing a given first grade by the number of live resident births of six years earlier. For example, the 1976-77 first grade class was divided by the number of 1970 resident live births. This was the last birth-to-first grade survival rate calculated. This average survival rate was then multiplied by the live resident births of the years 1971 through 1976 to obtain the projected first grade enrollments for the school years 1977-78 through 1981-82.

Projections of the second through twelfth grade enrollments were handled in a similar manner. Survival rates were calculated from grade to grade and averaged to obtain an average survival rate. For example, a survival rate might be calculated between the first and second grades by dividing the second grade enrollment of 1976-77 by the first grade enrollment of 1975-76. The major difference in projecting grades two through twelve enrollment and in projecting grade one enrollment is that only the four previous survival rates were used to obtain average survival rates for grades two through twelve while the previous five years were used to obtain the average survival rate from resident live births to first grade enrollment. (It should be emphasized that kindergarten enrollment has been ignored since it is neither mandatory or universal from district to district in Kentucky.) To project 1977-78 enrollment for the second grade, the average of the four survival rates is multiplied by the 1976-77 first grade enrollment. The result is the 1977-78 projected enrollment for the second grade.

It is recommended that this procedure be used to project no more than five years of enrollment. The sub-totals and totals are obtained by adding the appropriate projected grade enrollments for a given school year.

RESULTS

Utilizing the methodology as outlined above, historical data was compiled back through the 1971-72 school term. The fall enrollment statistics, which are collected each year at the end of the first month of school, was used in this case. The projection technique as outlined herein was used to project the enrollments for each grade, one through twelve for the school years 1977-78 through 1981-82. Grades two through twelve were projected for the 1982-83 school year. However, due to the fact that the live birth rates for 1976 were not available at the time this endeavor was undertaken, the first grade

and the projected totals were not completed. Table 3 shows the actual Fall enrollment by grade level of Kentucky public schools for the school years 1971-72 through 1976-77. In addition, this table also depicts the totals for various grade groups along with a total Fall enrollment for grades one through twelve for each of the past six years.

Below the double line on Table 3 is the projected Fall enrollments for each of the twelve grades using the Cohort-Survival Technique as outlined above. While it is realized that there are many unknown variables which could alter these projections, this is the best information we have available at the present time. This procedure or some slight alteration thereof is the same technique being used by other states and countries for making these same projections. Other states and countries are using these projections as a primary basis for future educational planning.

Table 4 depicts the same information as described and outlined above, except that it is for all Kentucky schools, rather than just public schools.

Graph 1 is a pictoral presentation of the public school enrollment. The solid bars represent historical data while the checked bars represent projections. Above each bar is the number of students either actually enrolled or projected to be enrolled during each school year, as indicated across the top of the graph. The numbers in parenthesis below the enrollment figure is the decline from the previous year. When one totals the decline numbers for the past five years, it can be seen that the public school enrollment has declined by 38,117 or approximately 5.4 percent during these years. When one follows the same procedure for the projected enrollments over the next five years, it will be evident that the total decline is projected to be 52,128 or approximately 7.9 percent.

If it could be assumed that one teacher could adequately instruct a total of 150 students per day, this projected decline would result in a need for

TABLE 3

STUDENT POPULATIONS 1971-77 -- PROJECTED STUDENT POPULATIONS 1978-83

KENTUCKY PUBLIC SCHOOLS

School Year	Grade 1	2	3	4	5	6	7	8	9	10	11	12	Totals 1-5	6-8	9-12	1-12
71-72	65146	61834	60959	60061	60995	60348	62409	61289	62435	55264	47925	42476	308995	184046	208100	701141
72-73	61053	58480	60238	60178	60137	61004	62861	61812	62314	57102	49167	42028	300086	185677	210611	696374
73-74	59298	55415	57014	59646	60165	60200	63167	61736	62479	56377	49948	431.6	291538	185103	211920	688561
74-75	57996	53384	54068	56221	59656	60083	61770	62248	62544	56478	49350	44183	281325	184101	212558	677984
75-76	58775	52521	51891	53302	55897	59396	61199	60568	62772	56490	50025	44015	272386	181163	213302	666851
76-77	61845	53548	51147	51413	53195	56204	61477	60651	63219	56880	50199	43246	271148	178332	213544	663024
77-78	63091	56032	52156	50533	51310	53195	57834	60555	61803	57213	50111	44175	273122	171584	213302	658008
78-79	57475	57160	54575	51530	50432	51310	54738	56966	61706	55932	50405	44098	271172	163014	212141	646327
79-80	55548	52072	55674	53920	51427	50432	52798	53917	58048	55844	49276	44356	268641	157147	207524	633312
80-81	55357	50326	50718	55006	53812	51427	51895	52006	54941	52533	49199	43363	265219	155328	200036	620583
81-82	56580	50153	49018	50109	54896	53812	52918	51117	52994	49722	46282	43295	260756	157847	192293	610896
82-83		51261	48849	48430	50009	54816	55373	52124	52088	47960	43805	40728				

TABLE 4

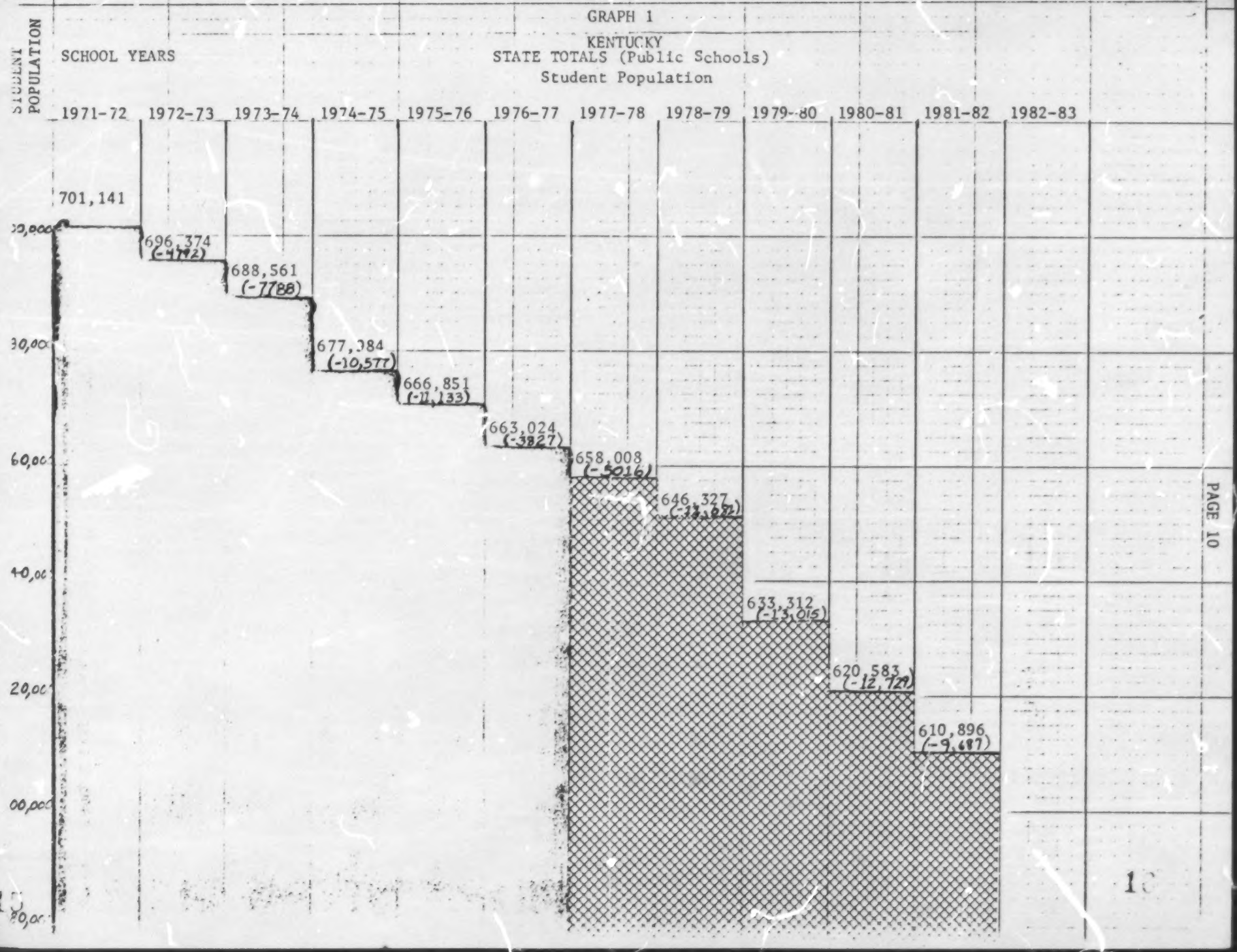
STUDENT POPULATIONS 1971-77 -- PROJECTED STUDENT POPULATIONS 1978-83

ALL KENTUCKY SCHOOLS

School Year	Grade 1	2	3	4	5	6	7	8	9	10	11	12	Totals 1-5	6-8	9-12	1-12
71-72	70591	68349	67338	66646	67806	67452	68834	67328	67177	59745	52076	56751	340730	203614	225749	770093
72-73	66411	64437	66705	66438	66468	67637	68917	67887	64966	61210	53198	45925	330559	204441	227499	762499
73-74	63634	61134	62926	65879	66336	66426	69090	67583	67378	60708	53931	46876	320909	203099	228893	752901
74-75	64107	59229	60052	62370	66094	66370	67731	68173	67540	61076	53394	47899	311852	202274	229963	744035
75-76	64386	58922	47991	59490	62319	66201	67396	66708	68088	61270	54377	47802	304208	200305	231533	736046
76-77	69309	60298	57690	57774	59502	62891	68205	66994	68647	61955	54663	47331	304573	198090	232596	735259
77-78	69601	63695	59032	57228	57774	59681	64275	67319	67329	62331	54830	48322	307330	191275	232812	731417
78-79	63405	63963	62357	58560	57228	57947	60994	63439	67656	61135	55163	48470	305513	182380	232424	720317
79-80	61280	58259	62620	61858	58560	57400	59222	60201	63756	61432	54104	48764	302587	176823	228056	707466
80-81	61069	56316	57045	62119	61858	58736	58663	58452	60502	57890	54637	47828	298407	175851	220857	695115
81-82	62418	56122	55133	56589	62119	62044	60028	57900	58744	54936	51233	48299	292381	179972	213212	685565
82-83		57362	52006	54692	56589	62306	63409	59248	58190	53340	48618	45290				

GRAPH 1

KENTUCKY
STATE TOTALS (Public Schools)
Student Population



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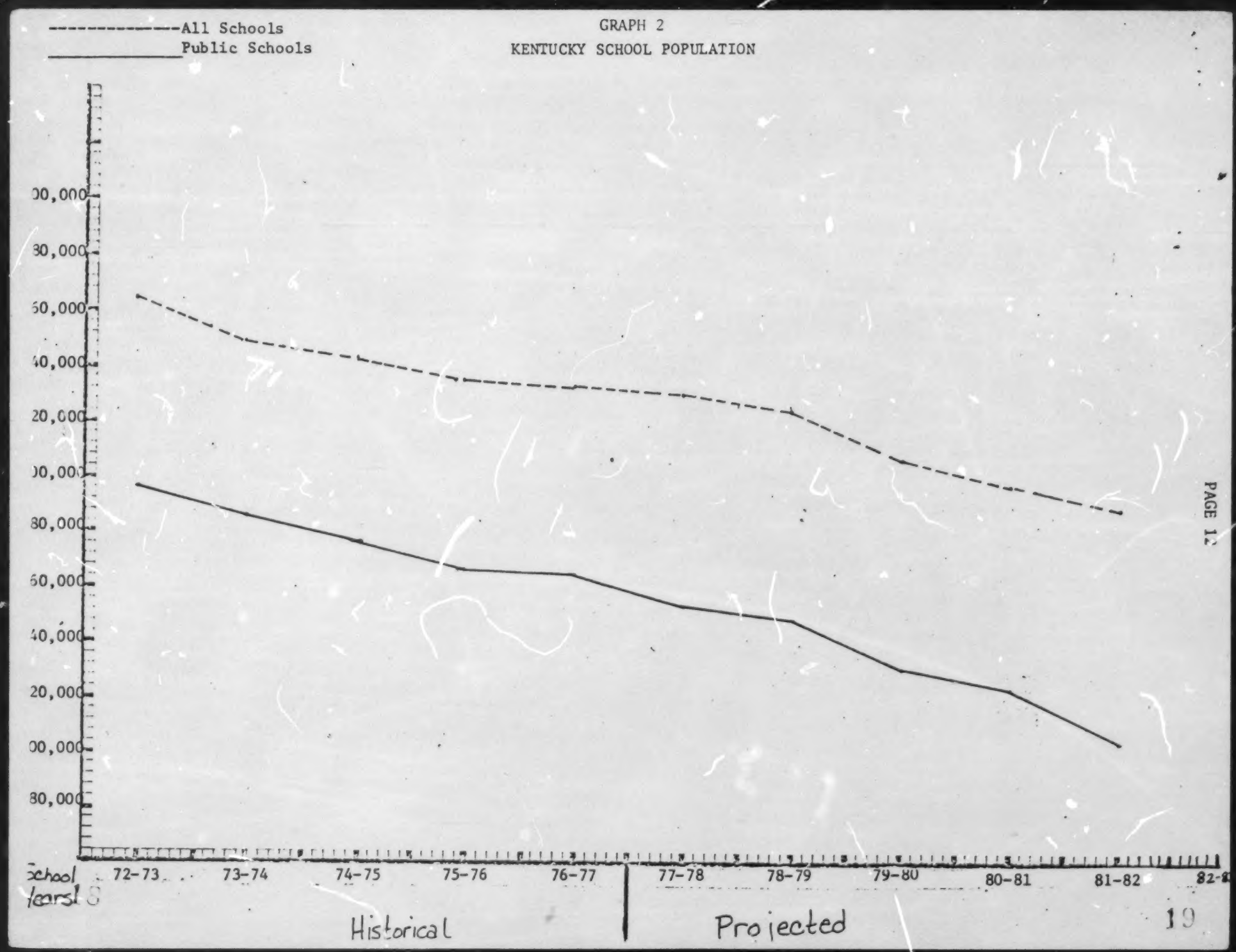
approximately 348 fewer teachers by the 1981-82 school year. This projection does not include kindergarten. However, even if every school in the state were to initiate kindergarten during the next year, this would only postpone the inevitable for one year. The rate of decline would be the same. Others might say that the enrollment in private and parochial schools would account for much of this decline. However, by observing Graph 2, one can readily see the difference in the rate of decline when one compares the public schools with all schools.

SUMMARY

As Alvin Toffler stated in Man, Education & Society in the Year 2000, "a false image of the future destroys the relevance of the educational effort." If we in Kentucky continue to project increased enrollments in the face of mounting opposing facts, we will destroy the overall relevance of our educational effort. The facts presented in this short paper is but one of several reasons why the educational bond issues during the last election were defeated. We could well be facing a tax payers revolt and if we in education do not take advantage of some of the blatant facts, [illegible]ne decline in enrollment, for future planning, we may be contributing to such a revolt. School bond referendums are one of the few avenues still available to the local citizenry to voice their concerns with local goverment.


----------All Schools
_____Public Schools
GRAPH 2
KENTUCKY SCHOOL POPULATION
00,000
30,000
60,000
40,000
20,000
00,000
80,000
60,000
40,000
20,000
00,000
80,000
72-73
73-74
74-75
75-76
76-77
77-78
78-79
79-80
80-81
81-82
School Years
Historical
Projected